

## ABSTRACT

A gas pressurization system comprising a gas inlet valve configured to receive an inlet gas stream. A clean-up system is coupled to the gas inlet valve. A recovery heat exchanger coupled to the clean-up system. The recovery heat exchanger is configured to remove thermal energy from the inlet gas stream and cool the inlet gas stream to one of a pre-cooled gas and liquid stream. An expander coupled to the recovery heat exchanger is configured to expand the pre-cooled liquid stream. A refrigeration unit coupled to the expander and configured to cool the expanded pre-cooled liquid stream to a liquid phase. A buffer storage unit is coupled to the refrigeration unit. A pump is coupled to the buffer storage unit at a pump suction and has a pump discharge coupled to the recovery heat exchanger. A high-pressure storage unit coupled to the pump discharge downstream of the recovery heat exchanger.